

**UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Bertrand LEROUX, et al.  
Application No.: 10/582,259  
Filed: February 21, 2007  
Title: Staged Combustion Method Using a Low-Oxygen Gas  
TC/A.U.: 3743  
Examiner: Chuka Clement NDUBIZU  
Docket No.: Serie 6439  
Customer No.: 40582

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**REPLY BRIEF**

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Reply Brief is filed pursuant to the Examiner's Answer dated November 23, 2010.

In reply to the Examiner's Answer, Appellants make the following five arguments applicable to each of the grounds of rejection being appealed.

First, the rejections are not supported by substantial evidence because the Examiner's derivation of the relationship between D and d<sub>3</sub> of Dugue utilizes assumptions regarding the Khinkis drawings that are contrary to Federal Circuit precedent and Khinkis fails to cure the deficiencies of Dugue. Second, the rejections are not supported by substantial evidence because the Examiner has merely concluded that Appellants' reasons for making the cross-section of the

injector for the oxygen-lean oxygenated gas much larger than that of the injector for the second jet of oxygen-rich oxygenated gas are within the knowledge of the skilled artisan instead of showing where and how the prior art teaches such reasons. Third, the mere use of Khinkis-taught oxygen-rich gas for the primary oxidizer of Dugue suggested by the Examiner would not have resulted in the effect pointed to by the Examiner as supporting a rationale to combine the references' teachings. Fourth, the rejections are not supported by substantial evidence because the Examiner improperly construes Dugue as suggesting the use of an oxygen-rich oxygenated gas for the primary oxidant. Fifth, the Examiner's application of *In re Aller* may be distinguished from the instant case.

First, the rejections are not supported by substantial evidence because the Examiner's derivation of the relationship between  $D$  and  $d_3$  of Dugue utilizes assumptions regarding the Drawings that are contrary to Federal Circuit precedent. In deriving the relationship between  $D$  and  $d_3$  (i.e., that  $D$  is putatively much larger than  $d_3$ ), the Examiner assumes from FIG 3b of Dugue that  $d_2$  is more than three times  $d_3$ . This assumption is contrary to Federal Circuit precedent and any legal conclusion based upon such a factual determination is fatally defective. "Absent any written description in the specification of quantitative values, arguments based on measurement of a drawing are of little value". Nystrom v. Trex Co., 424 F.3d 1136, 1149 (Fed. Cir. 2005) (quoting *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956, (Fed. Cir. 2000)). Since the Examiner attempts to make a factual determination that  $d_2$  is more than three times  $d_3$  solely based upon FIG 3b and because Dugue does not state that the drawings within are to scale, the derivation based upon this flawed finding is similarly flawed. Without the derivation, the Examiner has completely failed to show that Dugue teaches the general conditions of the claimed subject matter.

Second, the rejections are not supported by substantial evidence because the Examiner has merely concluded that Appellants' reasons for making the cross-

section of the injector for the oxygen-lean oxygenated gas much larger than that of the injector for the second jet of oxygen-rich oxygenated gas are within the knowledge of the skilled artisan instead of showing where and how the prior art teaches such reasons. Appellants have previously argued that the limitation regarding the relationship between area of the cross section of the injection orifice for the oxygen-lean oxygenated gas and the area of the injection cross section for the second jet of oxygen-rich oxygenated gas is a significant effect and/or critical result. In the Answer, the Examiner takes the position that the Appellants' reasons for making the cross-section of the injection orifice for the oxygen-lean oxygenated gas much larger "are within the knowledge of one of ordinary skill in the art of combustion and burner design". Applicants assert that the Examiner has improperly substituted his or her perception of the scope of knowledge that may be imputed to the skilled artisan and not made the necessary showing that the prior art teaches this knowledge. In view of the Examiner's complete failure to point to any evidence supporting such a proposition, the Examiner's refusal to consider Applicants' reasons amounts to an improper disregard of Appellants' arguments.

Third, the bare use of Khinkis-taught oxygen-rich gas for the primary oxidizer of Dugue as suggested by the Examiner would not have resulted in the effect pointed to by the Examiner as supporting a rationale to combine the references' teachings. The Examiner takes the position that Khinkis is only relied upon for its teaching of using an oxygen-rich gas for the primary oxidant in Dugue completely divorced from Khinkis's related teaching of separated combustion and cracking chambers. As detailed in the Appeal Brief, the Khinkis effects (enhanced efficiency and lowered NO<sub>x</sub>) are achieved through the use of separate combustion and cracking chambers. If one of ordinary skill in the art were to only duplicate the limited Khinkis teaching regarding the use of an oxygen-rich primary oxidant, such a one would not have reasonably expected the enhanced efficiency and NO<sub>x</sub>-lowering effect of Khinkis to follow. This is because the separated combustion and

cracking chambers (in addition to the Khinkis-described combustion temperatures) are equally responsible for achievement of enhanced efficiency and lower NOx.

Fourth, the rejections are not supported by substantial evidence because the Examiner improperly construes Dugue as suggesting the use of an oxygen-rich oxygenated gas for the primary oxidant. The Examiner relies upon column 3, lines 46-52 of Dugue:

*“According to another aspect of the invention, the rapid mixing first stream(s) of primary oxidizer represents (represent) from 5 to 40 vol % of the total amount of oxidizer, whereas the slow-mixing second stream(s) of primary oxidizer represents (represent) from 5 to 95 vol % of the total amount of oxidizer, the possible balance of oxidizer being provided by the streams of secondary oxidizer.”*

Nowhere in this portion of the Specification does Dugue mention an oxygen concentration. Thus, any rejection relying upon this finding of fact is fatally flawed.

Fifth, the Examiner's application of *In re Aller* may be distinguished from the instant case. The U.S. Court of Customs and Patent Appeals held that “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation”. *Id.* at 456, at 235 (citing *In re Swain*, 156 F.2d 239, 33 C.C.P.A., Patents, 1250; *Minnesota Mining & Mfg. Co. v. Coe*, 69 App.D.C. 217, 99 F.2d 986; and *Allen v. Coe*, 77 U.S.App.D. C. 324, 135 F.2d 11). In *Aller*, the claims differed from the prior art in that the recited temperature and concentration differed from those of the prior art in only a small degree. That set of facts and associated holding may be distinguished from the application of Dugue at issue.

The Examiner does not seek to modify easily adjustable or result effective variables like concentration or temperature. Rather, the Examiner seeks to modify a mathematical relationship between  $d_3$  and  $D$ . This mathematical relationship may only be adjusted by first selecting a value for  $D$  since this is the only variable

of D and d3 for which Dugue specifies a value, namely, greater than or equal to 0.5 cm. Then an incremental series of values for d3 must be selected that will result in the claimed mathematical relationship. After determining whether these series of combinations of D and d3 are successful or not, another value of D must be selected. Similarly, another incremental series of values for d3 would then need to be selected that will result in the claimed mathematical relationship. Next, it must be determined whether the members in this second set of combinations of D and d3 are successful. This would need to be repeated until one of ordinary skill in the art would conclude that Dugue was “optimized”.

As seen above, “optimization” of the Dugue is not merely discovering optimal values for known conditions of variables such as concentration or temperature. Rather, such “optimization” amounts to substantial and undue experimentation involving innumerable permutations of D and d3 that satisfy the claimed mathematical relationship.

Instead, Appellants argue that the issue and fact pattern of *In re Antonie* (559 F.2d 618 (CCPA 1977)) is a better analogy for the instant case. The claim at issue in *In re Antonie* was directed to a ratio of tank volume to contactor area of 0.12 gal./sq. ft. for purposes of achieving the most desirable or optimum treatment capacity for a given contactor area. The closest prior art taught the basic structure of the claimed device but was silent regarding quantitative design parameters other than to give data on a single example but not tank volume. The prior art stated that an efficiency could be increased to a certain percentage by increasing the area of the contactor. The Court of Customs and Patent Appeals held that since the prior art did not make clear whether increased efficiency was a function of tank volume or of the ratio between the tank volume and contactor area, a determination of that increased efficiency could only be determined from data representing either efficiency at varying tank volume, fixed throughput, and fixed contactor area or throughput at varying tank volume, fixed efficiency, and fixed contactor area. *Id.*, at 620. The Court held that this sort of experiment would not be suggested by the teachings of the prior art since such prior art was not trying to

maximize or control "treatment capacity." *Id.*, at 620. The Court further held that experiments suggested by the prior art do not reveal the property which the applicant had discovered and that the USPTO provided us with no other basis for the obviousness of the necessary experiments. *Id.*, at 620. In conclusion, the Court held that such a fact pattern was an exception to the *In re Aller* rule. *Id.*, at 621.

## CONCLUSION

The Examiner errs in finding that:

- A. Claims 16-21, 23-24 and 29-30 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,910,879 (Dugue) in view of U.S. Patent No. 4,761,132 (Khinkis).
- B. Claim 24 is unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,910,879 (Dugue) in view of U.S. Patent No. 4,761,132 (Khinkis) and further in view of U.S. Patent No. 5,759,022 (Koppang).

Reversal of the Examiner is respectfully requested.

Respectfully submitted,

/Christopher J. Cronin/  
Christopher J. Cronin  
Registration No. 46,513

Date: January 24, 2011  
Air Liquide  
200 GBC Dr  
Newark, DE 19702  
Phone: (302) 286-5525  
Fax: (302) 286-5596